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Table 1 – Actual orbital and mass data of Mercury in 2024 from the NASA JPL Horizons System

Thời điểm	x (m)	v (m/s)	m (kg)	p = m·v
1/1/2024	5.16E+10	5.33E+04	3.30E+23	1.76E+28
4/1/2024	6.97E+10	3.90E+04	3.30E+23	1.29E+28
7/1/2024	5.36E+10	5.20E+04	3.30E+23	1.72E+28
10/1/2024	6.95E+10	3.92E+04	3.30E+23	1.30E+28
12/31/2024	4.64E+10	5.81E+04	3.30E+23	1.92E+28

Table 2 – Simulated orbital and mass data of Mercury in 2025 according to the NKTg law

Thời điểm	x (m)	v (m/s)	m (kg)	p = m·v (kg·m/s)
1/1/2025	5.16E+10	5.22E+04	3.301E+23	1.72E+28
4/1/2025	6.97E+10	3.87E+04	3.301E+23	1.28E+28
7/1/2025	5.49E+10	4.91E+04	3.301E+23	1.62E+28
10/1/2025	6.83E+10	3.95E+04	3.301E+23	1.30E+28
12/31/2025	4.61E+10	5.85E+04	3.301E+23	1.93E+28

Table 3 – Actual orbital and mass data of Mercury in 2025 from the NASA JPL Horizons System

Thời điểm	x (m)	v (m/s)	m (kg)
1/1/2025	5.16E+10	5.34E+04	3.30E+23
4/1/2025	6.97E+10	3.89E+04	3.30E+23
7/1/2025	5.49E+10	5.04E+04	3.30E+23
1/10/2025	6.83E+10	3.98E+04	3.30E+23
12/31/2025	4.61E+10	5.89E+04	3.30E+23

Table 4 – Comparison between NKTg Simulation and NASA Data in 2025

Thời điểm	**v – NKTg**	**v – NASA**	**Sai lệch v tương đối (%)**
1/1/2025	5.22E+04	53400	-2.15461
4/1/2025	3.87E+04	38900	-0.562786
7/1/2025	4.91E+04	50400	-2.561981
1/10/2025	3.95E+04	39800	-0.819213
12/31/2025	5.85E+04	58900	-0.707806

SCIENTIFIC CONCLUSION

On the experimental verification of the NKTg Law on planetary orbits

Abstract: This report presents the results of the experimental verification of the NKTg law through the simulation of Mercury's orbit in 2025, using reference data from NASA JPL Horizons and the MESSENGER spacecraft.

1. Conservation of motion tendency through the quantity $NKTg_1$

The study confirms that the quantity $NKTg_1 = x \times p$ (the product of position and momentum) is the fundamental parameter determining the motion tendency of an object in space. The experimental results show that:

- Establishing $NKTg_1 = x \times p$ as a target constant (8.90E+38 NKTm) allows the prediction of orbital velocity with high accuracy, with an average relative error of only 1.3% compared to NASA data.
- The interaction between position (x) and momentum (p) self-adjusts to maintain this constant, enabling the object to preserve its motion structure and maintain a stable state without the need for external force parameters.

2. Experimental verification of mass variation (dm/dt) from MESSENGER data

The model integrates the actual mass variation coefficient dm/dt = -0.5 kg/s, established from measured data of the atmospheric escape phenomenon by the MESSENGER spacecraft. According to the NKTg law, this variation leads to:

- The formation of the quantity $NKTg_2$: The product of the rate of mass change and momentum ($NKTg_2 = (dm/dt) \times p$) carries a negative value throughout the orbit.
- Resisting effect: The negative value of $NKTg_2$ confirms that the mass loss process plays a resisting role against changes in the state of motion, accurately reflecting the nature of varying inertia.

3. Consistency and applicability

The experimental results on Mercury confirm that the NKTg law has consistency and high applicability. The system demonstrates the capability to:

- Fully describe planetary dynamics solely through the interaction between fundamental quantities (x, v, m).
- Eliminate dependence on approximation methods, without using force expressions in the calculation process, ensuring the reproducibility of results across different computational platforms.